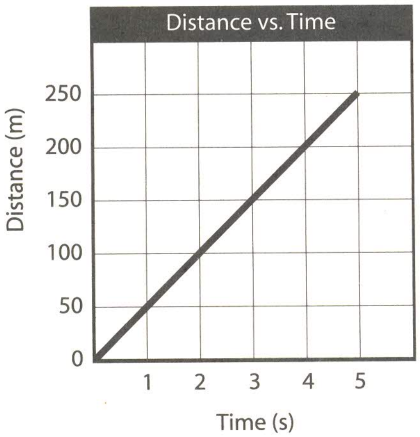
(17)

t (s)	d (m)
0.0	0.0
1.0	50.
2.0	1.0×10^2
3.0	150
4.0	200
5.0	250



The slope is the same as the speed:

$$m = \frac{\Delta y}{\Delta x} = \frac{250\text{ m} - 0\text{ m}}{5.0\text{ s} - 0\text{ s}} = \frac{250\text{ m}}{5.0\text{ s}}$$

$= 50.\text{ m/s}$

(18) 0 m/s; 9.81 m/s^2 down

(19) *a* 20 km

b 14 km at 45° north of east

(20) 2

(21) 4

(22) 20.0 s; 491 m

(23) 78 m/s; 310 m

(24) 2

(25) 55 m/s

(26) 25 m/s

(27) 78 km at an angle of 43° east of north

(28) 2

(29) 63 m

(30) 60. m

(31) *a* 33 s; 3900 m

b Student diagrams should show an initial velocity vector at 53° to the horizontal. The parabolic path should be like Figure 2.9, drawn with velocity vectors tangent to the path.

Page 39

(32) 2 **(34)** 2 **(36)** 3

(33) 1 **(35)** 4

(37) Angle = 0°:

$F_{net} = 10.\text{ N} + 10.\text{ N} = 20.\text{ N}$

Angle = 90°:

$F_{net}^2 = (10.\text{ N})^2 + (10.\text{ N})^2$

$F_{net} = \sqrt{2.0 \times 10^2\text{ N}} = 14\text{ N}$

Angle = 180°:

$F_{net} = 10.\text{ N} - 10.\text{ N} = 0\text{ N}$

Angle = 0°:

$F_{net} = 70.\text{ N} + 40.\text{ N} = 110.\text{ N}$

Angle = 90°:

$F_{net}^2 = (70.\text{ N})^2 + (40.\text{ N})^2$

$F_{net} = \sqrt{6500\text{ N}} = 81\text{ N}$

Angle = 180°:

$F_{net} = 70.\text{ N} - 40.\text{ N} = 30.\text{ N}$

(38) 98.1 N; 39.2 N; 0.41 kg; 1.02 kg

(39) *a* F_{normal}: −203 N; $F_{parallel}$: 457 N

b For a 30° incline: F_{normal}: −433 N; $F_{parallel}$: 250 N

c As the angle of the incline decreases, the normal force increases and the parallel force decreases.

(40) The centripetal force points toward the center of the circle because a force in this direction maintains circular motion.

(41) $T = 0.2$ s; $f = 10$ rev/s

(42) 1

(43) centripetal acceleration: 62 m/s^2: tension: 120 N

(44) Weight depends on gravity and gravity varies depending on how high above Earth the object is.

(45) weight = 98.1 N; mass = 10.0 kg; weight = 16.4 N

(46) 8.0×10^{-8} N

(47) an experiment comparing the acceleration of a baseball and bowling ball being thrown with the same force

(48) 2

(49) 2

(50) 2

(51) 20 N

(52) Ignoring air resistance, the net force on the skydiver and acceleration remain the same because of Newton's second law.

Page 41

(53) $J = 2.0 \times 10^2$ N•s

$\Delta v = 1.0 \times 10^2$ m/s

(54) $m = 1.0 \times 10^3$ kg

$\Delta p = 25{,}000$ kg•m/s

$t = 25$ s